

HANDBOOK
OPERATING INSTRUCTIONS

ANTENNA COUPLING UNIT
CU-92/APN AND CU-92A/APN

NOTE: This publication replaces AN 16-35CU92-2 dated 22 April 1945.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE AND
THE CHIEF OF THE BUREAU OF AERONAUTICS

16 MARCH 1949

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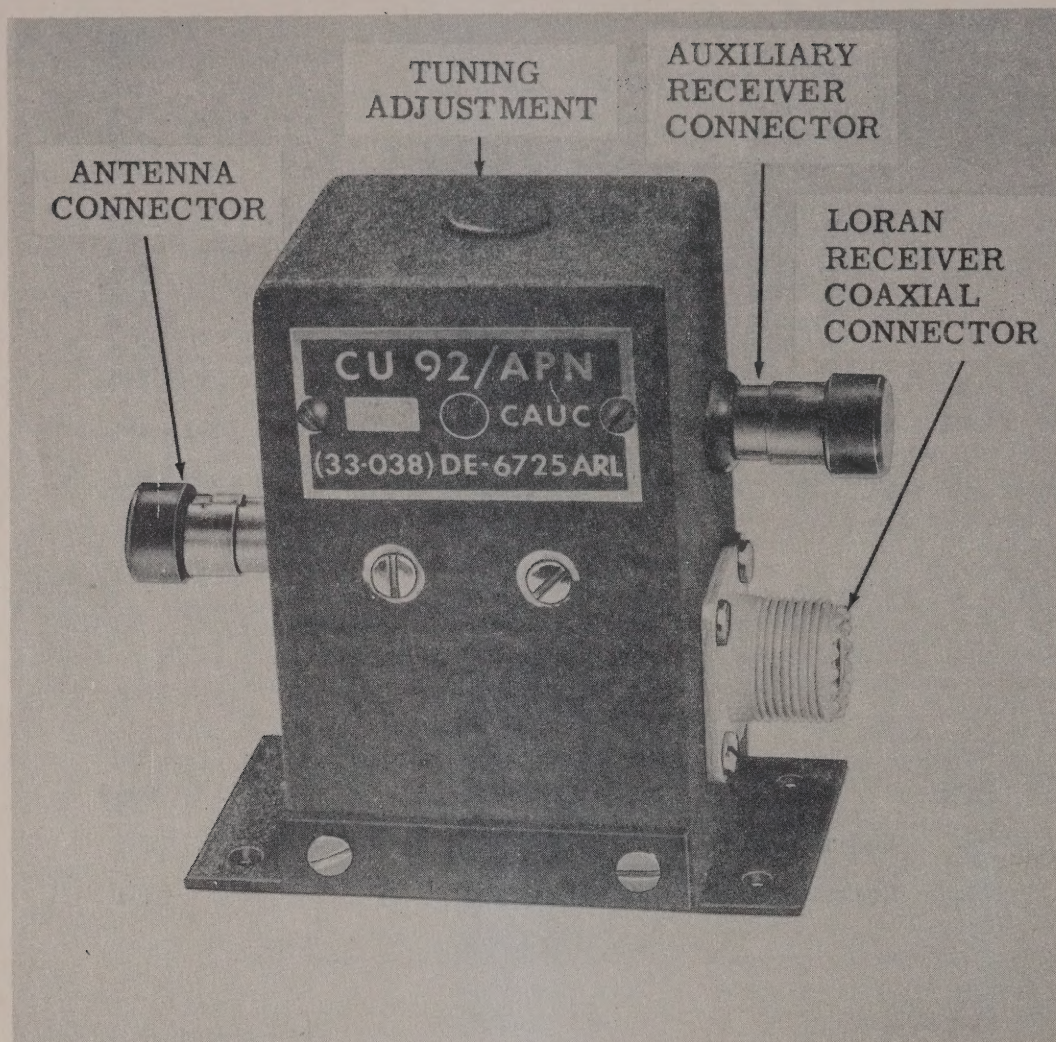


Figure 1-1. Antenna Coupling Unit CU-92/APN -- Front View

SECTION I

GENERAL DESCRIPTION

1. GENERAL.

a. Antenna Coupling Unit CU-92/APN is an impedance matching device designed to permit the effective operation of a Loran receiver and an auxiliary receiver from any fixed aircraft antenna. (See figure 1-1.)

b. Antenna Coupling Unit CU-92A/APN is an impedance matching device designed to permit the effective operation of a Loran receiver from any fixed aircraft antenna, and to provide a grounding path for signals of over 65 volts induced therein as the result of the simultaneous operation of liaison equipment on a separate antenna.

2. EQUIPMENT SUPPLIED.

Table 1-1 lists the equipment supplied.

TABLE 1-1. EQUIPMENT SUPPLIED

<u>Quantity per Equipment</u>	<u>Name of Unit</u>	<u>Army Type Designation</u>	<u>Dimensions (inches)</u>	<u>Weight (pounds)</u>
1	Antenna Coupling Unit	CU-92/APN	1-5/8 x 2 x 3	0.5 (approx)
1	Antenna Coupling Unit	CU-92A/APN	1-5/8 x 2 x 3	0.5 (approx)

3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

In addition to the Loran equipment and fixed antenna, the test equipment, listed in table 1-2, is required but not supplied.

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

<u>Quantity per Equipment</u>	<u>Name of Unit</u>	<u>Army Type Designation</u>	<u>Required Characteristics</u>
1	Test Set	TS-251/UP (or equal)	Radio frequency signal generator capable of providing approximately 1 volt modulated output over the range of the Loran band.

SECTION II

INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

a. **PROCEDURE.** - Antenna Coupling Unit CU-92/APN is normally mounted as close to the fixed antenna as is practical. If a transmit-receive antenna switch or changeover relay is used, the coupling unit is mounted nearby. The unit, which is housed in a 1-5/8 inch x 2 inch x 3 inch one-piece box, can be mounted in any position on the nearest convenient surface. It is attached by means of screws placed through four holes in the base. The case must be grounded to the aircraft either directly through the fastenings, or by means of a ground lead. Antenna Coupling Unit CU-92A/APN is completely interchangeable with Antenna Coupling Unit CU-92/APN mechanically. The CU-92A/APN may be used in any aircraft, while the CU-92/APN should be used only in aircraft where the Loran and Liaison equipments operate from the same antenna.

b. **CABLE CONNECTIONS.** - Connect the wire from the antenna, or the "receiver" connection on the transmit-receive antenna switch, to the "ANTENNA" binding post on the coupling unit. Connect the coaxial cable from the Loran receiver to the coaxial jack on the coupling unit by means of an AN-coaxial plug. The antenna lead of the auxiliary receiver connects to the remaining auxiliary binding post.

NOTE

If no auxiliary receiver is used, this binding post must be grounded.

2. ADJUSTMENTS.

a. **EQUIPMENT REQUIRED.** - Following is a list of equipment required for the adjustment of Antenna Coupling Unit CU-92/APN or CU-92A/APN.

(1) Loran equipment, with which the coupling unit is to be used. This equipment must be properly aligned in accordance with instructions given in Handbook of Maintenance Instructions for Loran equipment.

(2) A radio frequency signal generator or Test Set TS-251/UP, or equal, capable of covering the Loran band with a modulated output of approximately 1 volt.

b. ALIGNMENT PROCEDURE.

(1) Make sure that the Loran receiver has been properly aligned before installation. This includes an initial alignment of the antenna trimmers.

(2) Slide the receiver out of its case far enough to permit adjustment of the antenna trimmers.

(3) Set up the radio frequency signal generator to produce a modulated output to maximum, and set the frequency to the value corresponding to "channel 2" of the receiver channel selector switch.

(4) Turn on the Loran equipment and allow a 5-minute warm-up period.

(5) Couple the signal generator to the "ANTENNA" side of the coupling unit by wrapping a single loose loop of insulated wire from the signal generator around the "ANTENNA" lead.

(6) Set the channel selector switch on the Loran receiver to position "2."

(7) Adjust the gain control on the receiver to produce an image approximately 1-inch high on the Loran indicator.

NOTE

Readjustment of the gain control will be necessary during the adjustment procedure to maintain the image approximately 1-inch in height.

(8) Remove the plug button from the top of the coupler unit. Insert a tuning tool or small screw driver in the slotted end of the shaft and adjust for maximum gain as indicated by the height of the image on the Loran indicator.

(9) Replace the plug. Make no further adjustments on the coupler unit.

(10) Adjust the "channel 2" antenna trimmer in the Loran receiver for maximum gain as indicated by the image height on the Loran indicator.

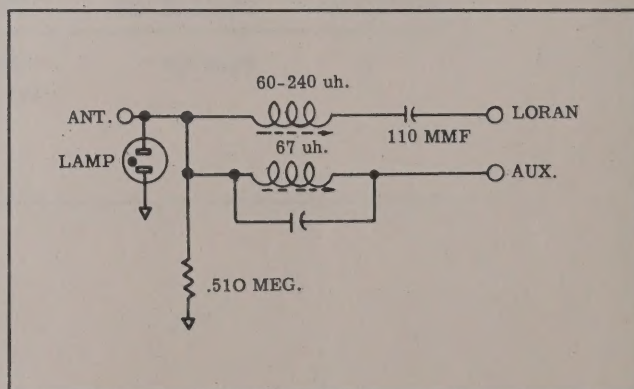


Figure 2-1. Antenna Coupling Unit CU-92A/APN -- Schematic Diagram

(11) Set the receiver channel selector switch on position "1."

(12) Set the signal generator tuning dial to the corresponding frequency.

(13) Adjust the "channel 1" antenna trimmer in the Loran receiver for maximum response. Watch the Loran indicator to determine the correct setting.

(14) Perform steps (10) through (13) for "channel 3" and "channel 4," adjusting the corresponding antenna trimmers.

(15) Slide the receiver back into its case and fasten.

NOTE

In theaters of operation where one channel is of primary importance and the others are of secondary importance or nonexistent, the coupler alignment in step (8) is performed on this channel to provide maximum gain. The remaining channels are adjusted as directed in steps (10) through (13).

(16) If the Loran receiver is replaced for any reason, the antenna circuits on the new receiver must be readjusted in accordance with the procedure described above.

NOTE

When a replacement Loran receiver is installed it is not necessary to return the coupler.

SECTION III OPERATION

No operation of this equipment is necessary. It automatically performs its function when either or both the Loran equipment and the auxiliary receiver are operated.

SECTION IV EMERGENCY OPERATION AND REPAIR

The only emergency repair possible is the complete elimination of the coupler. Disconnect the coaxial lead and make a direct connection to the antenna lead-in. Operation under these emergency conditions will not be very satisfactory since the resulting impedance mismatch will cause a considerable loss of signal. If this emergency operation is employed, it is essential that the electrical connections be as tight as possible.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS, UNITED STATES AIR FORCE
WASHINGTON

TECHNICAL ORDER
NO. 01-1-342

21 March 1949

**MODIFICATION OF ANTENNA COUPLING UNIT CU-92/APN-ALL AN/APN-9
EQUIPPED AIRCRAFT USING SEPARATE LORAN AND LIAISON ANTENNAS**

By whom work will be accomplished: Organizational maintenance activities, with the aid of field maintenance facilities if necessary.

When work will be accomplished: As soon as possible, but not later than the next major or 100-hour inspection period.

AF form entry required: 60A.

Modification of spares in stock: Coupling Units CU-92/APN, in stock, will be modified at the time of installation in subject aircraft.

1. PURPOSE.

To prevent failure of Antenna Coupling Units CU-92/APN due to the voltages induced in the Loran Antenna by signals in the Liaison Antenna, all Antenna Units CU-92/APN installed in subject aircraft which are in active status will be modified in accordance with the instructions contained in paragraph 2. This change provides a grounding path for the Loran Antenna for signals of over 65 volts ac.

2. MODIFICATION.

a. Remove mounting plate from coupling unit can. Retain all parts.

b. Drill can in accordance with figure 1.

c. Thoroughly clean all lacquer from surface adjacent to hole just drilled.

d. Install a fuse clip, part No. 1216, and a terminal, part No. 2108-4, inside the can, using a screw, part

No. AN515B4-4, a washer, part No. AN935-4, and a nut, part No. AN340B4. Shank of terminal and end of clip having indentations will be toward open end of can. (See figures 2 and 4.)

e. Carefully remove all lacquer from the tie-point (junction of resistor, capacitor, coil and antenna leads). (See figure 4.)

f. Tin the leads of a neon lamp, stock No. 8800-470787, for at least one-half their length.

g. Install the neon lamp, with leads toward open end of can, in the fuse clip. (See figure 4.)

h. Install a 3/8-inch length of tubing, stock No. 7100-882175, over upper lead of neon lamp. (See figure 2.)

i. Solder upper lead of neon lamp to tie-point.

j. Solder lower lead of neon lamp to the terminal installed in paragraph 2.d.

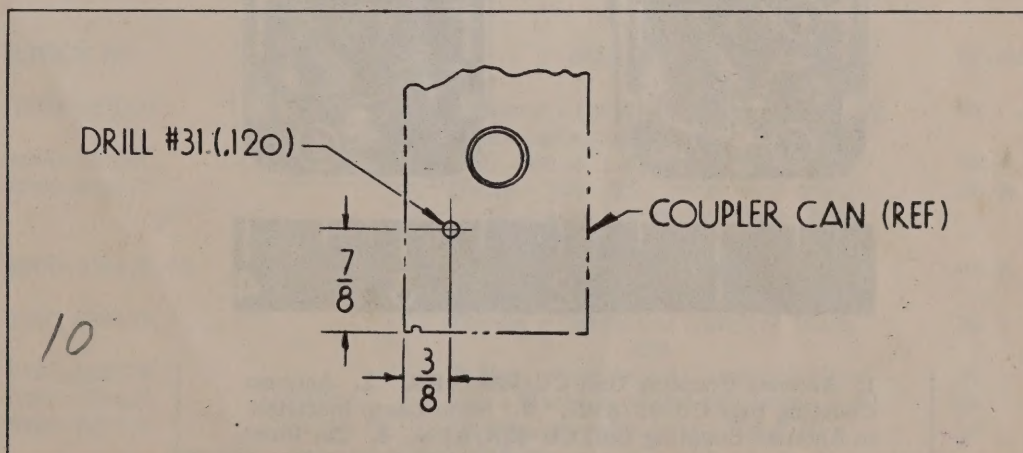


Figure 1

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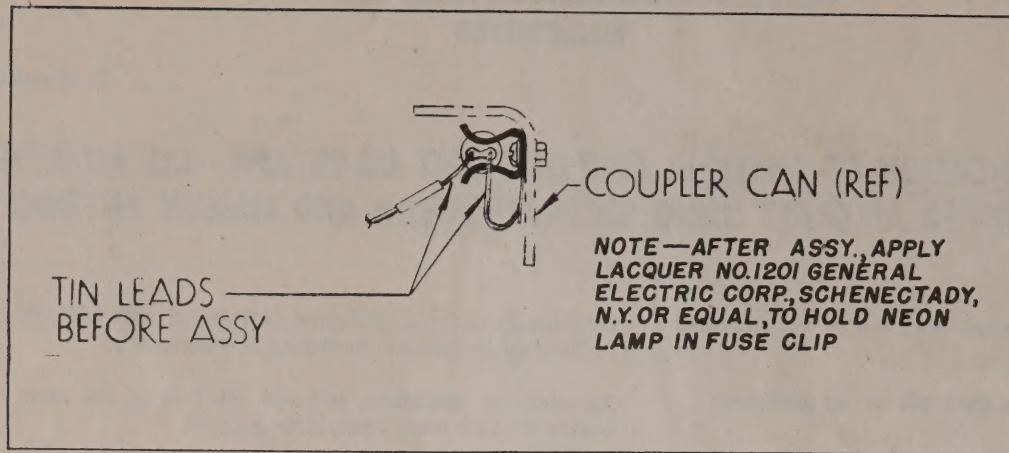


Figure 2

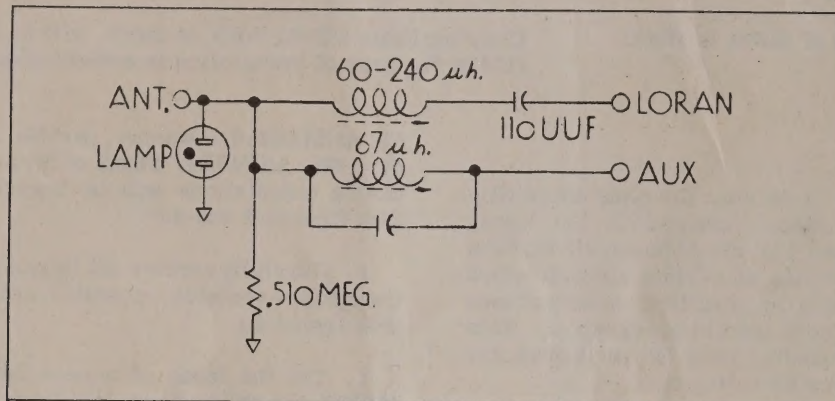
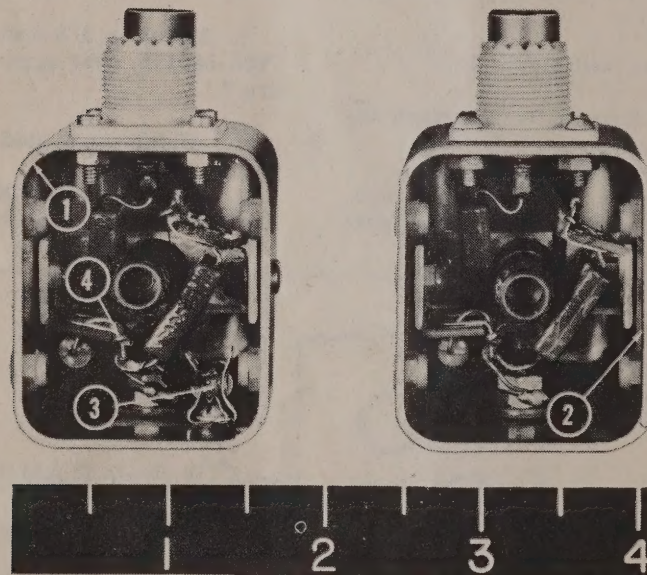
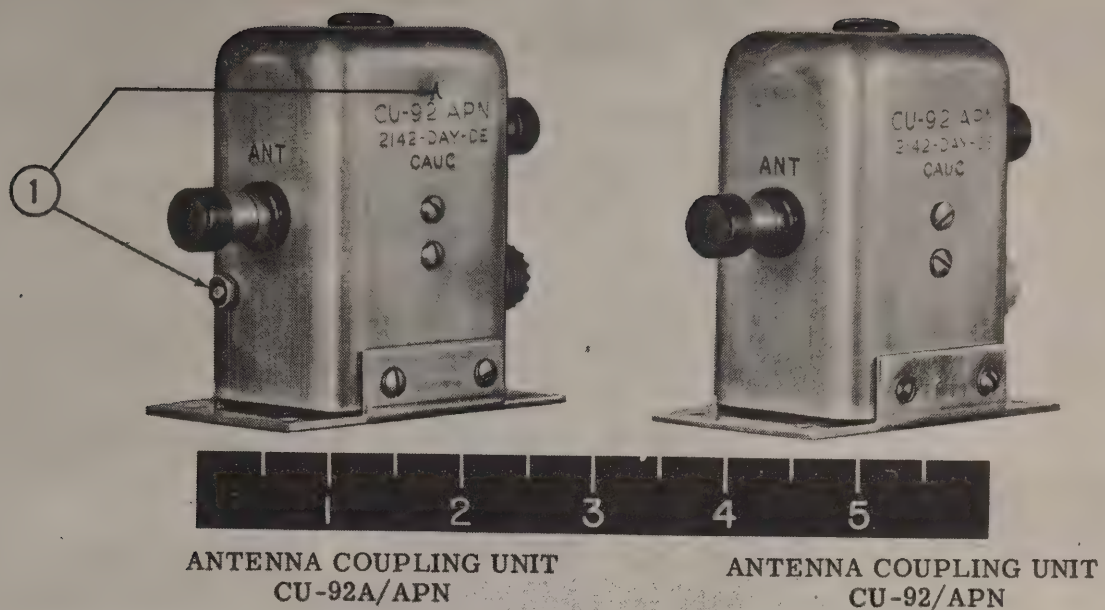


Figure 3



1. Antenna Coupling Unit CU-92A/APN. 2. Antenna Coupling Unit CU-92/APN. 3. Neon Lamp Installed in Antenna Coupling Unit CU-92A/APN. 4. Tie Point.

Figure 4 - Bottom Interior Views of Antenna Coupling Units CU-92A/APN and CU-92/APN (Mounting Plates Removed)



1. Distinguishing features of CU-92A/APN.

Figure 5 - Diagonal Views of Antenna Coupling Units CU-92/APN and CU-92A/APN Showing the "A" Added to the Nomenclature and the Mounting Nut for Neon Lamp Assembly in Antenna Coupling Unit CU-92A/APN

k. Apply lacquer, stock No. 7300-527000, to lamp and clips to secure lamp in clips.

l. Check for continuity between "ANT" terminal of coupler and the can. The reading should be approximately 500,000 ohms.

m. Stamp the letter "A" on name plate to convert the marking "CU-92/APN" to "CU-92A/APN." (See figure 5.)

n. Reinstall mounting plate.

o. Figure 5 shows the difference in external appearance of CU-92A/APN, as compared with CU-92/APN.

3. STOCK.

The following parts are required per antenna coupler to accomplish this change:

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
As req	7300-527000		Lacquer - GE Glyptol No. 1201, 1 gal can (or equal)	07	AF Stock
1	8800-152900	1216	Clip - Fuse, Littelfuse or equal	08-B	AF Stock
1	8800-470787		Lamp - 105-125 v, 0.04 w, T-2 bulb clear with 2 wire terminals Neon glow GE or equal, NE2	08-B	AF Stock
1	8800-875479-92	2108-4	Terminal - Internal teeth wing type Shakeproof or equal	08-B	AF Stock
3/8 in.	7100-882175		Tubing - Varnished Cambric black OR	21	AF Stock
	7100-882200		Tubing - Varnished Cambric yellow	21	AF Stock
1	6700-352400	AN340B4	Nut - Machine screw hex brass 4-40	29	AF Stock
1	6700-667700	AN515B4-4	Screw - Machine brass RH 4-40 x 1/4 in.	29	AF Stock
1	6700-989000	AN935-4	Washer - Lock No. 4 bolt	29	AF Stock

4. WEIGHT CHANGE. - The weight change effected by this modification is negligible.
5. MAN-HOURS REQUIRED. - Approximately 1/2 man-hour is required to accomplish this change.
6. CHANGE OF PERFORMANCE CHARACTERISTICS. - None, other than the added protection from excessive RF voltages.
7. INTERCHANGEABILITY. - CU-92A/APN and CU-92/APN are completely interchangeable mechanically. CU-92A/APN may be used in any aircraft, but CU-92/APN should be used only in aircraft where the Loran and Liaison equipments operate from the same antenna.

BY ORDER OF THE SECRETARY OF THE AIR FORCE:

HOYT S. VANDENBERG
Chief of Staff
United States Air Force

JOSEPH T. McNARNEY
General, United States Air Force
Commanding General
Air Materiel Command

Prepared by
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United States Air Force

JOSEPH T. McNARNEY
General, United States Air Force
Commanding General
Air Materiel Command

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SUPPLIES AND EQUIPMENT CLASSIFICATION

LET.	CHANGE	DATE	CHANGED BY
A	REVISION	02-29-62	542-8766-11
B	TITLE CHANGE	02-29-62	542-8766-11
C	DWG NO. WAS XH45D24762	02-29-62	542-8766-11

6 CLEARANCE FOR
SCREWDRIVER ADJUSTMENT



1 SEE NOTE 5

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NAME IDENTIFIED ON ALL DRAWINGS AS WELDING DIAGRAM LEADING SECTION-9 WITH DIA COUPLING UNIT CU-901A EX.

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 UNIT: _____
 SCALE: _____
 NOT TO SCALE
 1. ROUGH WORK FINISH
 2. SMOOTH WORK FINISH
 3. REMOVED FINISH AND SQUARE
 4. FINISH ALL SURFACES NOT OTHERWISE SPECIFIED

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84	12/10/45	W. J. JERRY		84	12/10/45	W. J. JERRY	
85	12/10/45	W. J. JERRY		85	12/10/45	W. J. JERRY	
86	12/10/45	W. J. JERRY		86	12/10/45	W. J. JERRY	
87	12/10/45	W. J. JERRY		87	12/10/45	W. J. JERRY	
88	12/10/45	W. J. JERRY		88	12/10/45	W. J. JERRY	
89	12/10/45	W. J. JERRY		89	12/10/45	W. J. JERRY	
90	12/10/45	W. J. JERRY		90	12/10/45	W. J. JERRY	
91	12/10/45	W. J. JERRY		91	12/10/45	W. J. JERRY	
92	12/10/45	W. J. JERRY		92	12/10/45	W. J. JERRY	
93	12/10/45	W. J. JERRY		93	12/10/45	W. J. JERRY	
94	12/10/45	W. J. JERRY		94	12/10/45	W. J. JERRY	
95	12/10/45	W. J. JERRY		95	12/10/45	W. J. JERRY	
96	12/10/45	W. J. JERRY		96	12/10/45	W. J. JERRY	
97	12/10/45	W. J. JERRY		97	12/10/45	W. J. JERRY	
98	12/10/45	W. J. JERRY		98	12/10/45	W. J. JERRY	
99	12/10/45	W. J. JERRY		99	12/10/45	W. J. JERRY	
100	12/10/45	W. J. JERRY		100	12/10/45	W. J. JERRY	

SUPPLIER AND EQUIPMENT CLASSIFICATION

LET.	CHANGE	DATE	CHECKER
A	REVISION	5-25-47	RJR
B	TITLE CHANGE	5-19-47	RJR
C	DWG NO. WAS XH45D24762	5-12-47	RJR

E CLEARANCE FOR
SCREWDRIVER ADJUSTMENT

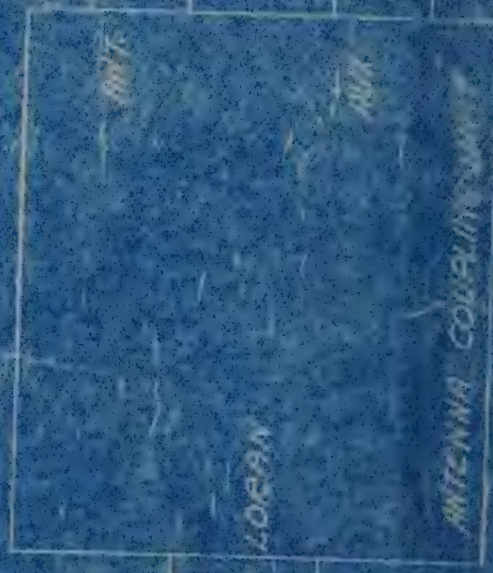


100 4-105E

3 AM

5

TO LONDON (GOSWELL)
355/100E



LOG OF FAUSE

3 AMP

DL

TO CHANDLER INSTRUCTIONS
SEE TABLE



SUPPLIES AND EQUIPMENT CLASSIFICATION

LET.	CHARGE	DATE	QTY
A	SCREWDRIVER	5-18-67	1
B	TITLE CHANGE	5-18-67	1
C	DWG NO. WAS XH45D24762	5-18-67	1

6" CLEARANCE FOR
SCREWDRIVER ADJUSTMENT



[illegible]

20. 25. 1962. 21. 61.

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1997

Q. 1. The following are the names of the four main types of the world's major religions. Write down the name of the religion that is most common in each of the following countries.

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Q. What is the difference between a "Q" and a "Q"?

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11" JAW
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CIRCUIT 100000

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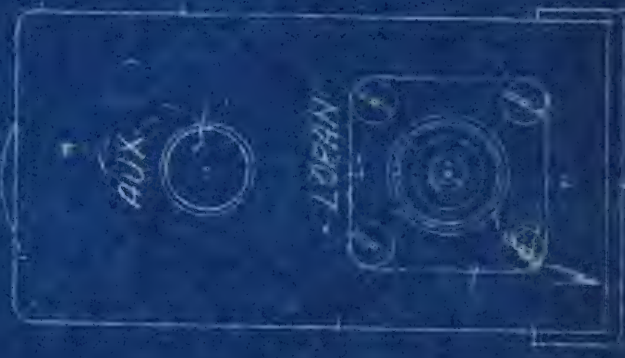
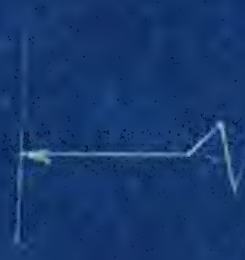
(continued)

SUPPLIES AND EQUIPMENT CLASSIFICATION

LET.	CHANCE	DATE	QTY
A		5-25-47	1
B		5-25-47	1
C		5-12-47	1

DWG NO. WAS XH45D24762

G CLEARANCE FOR
SCREWDRIVER ADJUSTMENT



*9	NO. 1	E. N. CABLE	GT. 0.10
10	2	RUSE	2.000

TO LITTON THERMISTOR
SEE CIRCUIT 1



DIG
FILES FOR MTA

92

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, LIMITS ON FRACTIONS $\pm \frac{1}{32}$ DECIMALS $\pm .010$ INCHES

- ① BUFF
- ② HAND FINISH
- ③ SMOOTH
- ④ ROUGH MACH. FINISH
- ⑤ ROUGH FILE
- ⑥ SAND BLAST

MATERIAL	FINISH	DRAFTSMAN	CHECKER	EXAMINED	REWORKED	REWORKED ON	NEXT APPROV.
		2-3-61	4-5-65				
		U.S. ARMY					

*9	REQ'D	E.F. CABLE	EG-8/10
10	2	FUSE	3 AMP

TO LIAISON TECHS UNIT
SEE NOTE 1



LET.	CHANGE	DATE
A	ADDED SCREWDRIVER ADJUSTMENT CLEARED TWO DIMS.	5-25-43
B	TITLE CHANGE	5-19-43
C	DWG NO. WAS XH45D24762	5-12-47

6 CLEARANCE FOR
SCREWDRIVER ADJUSTMENT

